ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES & CONCEPTUAL REMEDIAL ACTION PLAN
MALLISON FALLS MILL
3 & 4 MALLISON FALLS ROAD
WINDHAM, MAINE
REV. 0

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1.0 INTRODUCTION AND BACKGROUND

Ransom Consulting, Inc. (Ransom) has completed this Analysis of Brownfields Cleanup Alternatives (ABCA) to evaluate various remedial alternatives for the adverse environmental conditions identified throughout the Mallison Falls Mill properties located at 3 and 4 Mallison Falls Road in the Town of Windham, Cumberland County, Maine (the "Site"). This report summarizes the evaluation of remedial alternatives for the Site and includes a discussion of each remedial option, a cost estimate, the degree of effectiveness, ease of implementation, and the resilience of each option in light of reasonably foreseeable changing climate conditions. This report also contains a discussion of the recommended remedial alternative for the Site, as well as a Conceptual Remedial Action Plan (RAP) for the selected alternative. This report was prepared for the Mallison Falls Road, LLC in accordance with Ransom's Proposal and Scope of Work, dated April 15, 2015.

1.1 Purpose and Scope

The purpose of this report is to screen potential remedial action alternatives to mitigate previously identified adverse environmental conditions associated with the Site. Based on the information obtained during previous environmental investigations (summarized in Section 2.0), including Ransom's Phase I and Phase II Environmental Site Assessments (ESAs), three remediation options were considered for the Site and evaluated based on feasibility, effectiveness, cost, required time schedule, ability to meet the overall cleanup goal (protection of human health and the environment), and resilience to climate change conditions. Key consideration was given to eliminating or reducing, to the extent possible, the risk of exposure for existing and potential future Site occupants and workers to the identified contamination at the Site.

The overall objectives of this ABCA include the following:

1. Evaluating the remedial alternatives against specific evaluation criteria, including: overall protection of human health and the environment; technical practicality; ability to implement; reduction of toxicity, mobility, and volume; time required until remedial action objectives are attained; costs; and resiliency to climate change conditions.

2. Selecting the remedial alternative that best meets the objectives and considerations of the project.

3. Presenting a work plan (RAP) for implementing the selected remedial alternative.

Remediation alternatives evaluated in this ABCA include 1) a "No Action" alternative, 2) a "Soil Cover Systems" alternative, and 3) a "Limited Soil Removal and Soil Cover Systems" alternative. It should be noted that with the selected alternative, full abatement/removal of hazardous building materials is presumed to occur prior to renovation and/or partial demolition of the Site buildings. The Evaluation of Remediation Alternatives (Section 5.0) discusses the requirements for each alternative. The alternatives are evaluated on the previously mentioned criteria, and one alternative is recommended for implementation at the Site. Furthermore, a Conceptual RAP is presented in Section 6.0 for the recommended alternative.

1.2 Site Description

The Site consists of two irregular-shaped parcels of land, encompassing approximately 6.88 acres, located along the eastern side of the Presumpscot River to the north and south of Mallison Falls Road in the Town

of Windham. The Site is identified by the Town of Windham Assessor's Office as Lots 7 and 8 on Tax Map 3, which corresponds to 3 and 4 Mallison Falls Road, respectively. Please refer to the appended Figure 1, Site Location Map, to view the general location of the Site on a 7.5-minute topographic quadrangle.

Lot 7 is located to the south of Mallison Falls Road and the northern portion of this parcel is currently improved with three buildings (the "Site Buildings"), which are described as the Main Building, Shear Building, and the Press Building. The southern portion Lot 7 consists of undeveloped wooded land. Lot 8 is located to the north of Mallison Falls Road. A majority of this parcel is currently improved as an asphalt-paved and crushed-gravel parking lot for Site tenants and remaining portions consist of undeveloped wooded land. Please refer to the appended Figures 2 and 3, Site Plan and Site Detail Plan, for the layout of the Site and adjoining properties.

Based on available information, the Site consisted of undeveloped land prior to circa 1739. The property was developed with a sawmill circa 1740 and a woolen mill complex, including 4 tenement homes in 1866. The woolen mill complex and tenement homes were reportedly destroyed by a fire in 1888. The existing Site Buildings were constructed from 1888 to 1892 along with 3 to 4 additional buildings that were utilized as the Mallison Falls woolen mill complex. The woolen mill operated until the 1940s and former Site buildings were demolished at various dates during the 1900s. The Main Building was historically utilized for woolen mill operations. The Shear Building was reportedly utilized as a Dye House and the Press Building was historically utilized as the boiler house for the mill complex.

The Site was occupied by various industrial occupants from circa 1940 to circa 1965, most notably steel/metals manufacturers (Maine Steel Company, Steel Products Corp., Baker Manufacturing, American Wheelbrator), and a pulp and paper manufacturer (Hudson Pulp & Paper). Rich Tool & Die Company (metals machining) operated at the Site from circa 1965 to 1992 and leased portions of the buildings to other light industrial/commercial businesses.

Since 1998, the Main Building has been occupied by various commercial and light industrial tenants, most recently Portland Safe (which repairs and maintains safes and lock boxes) and GDL Paint (which operates a paint booth and stores flammable paints, paint thinners, and various paint additives inside the basement of the building). The Press Building has reportedly been utilized for miscellaneous storage purposes by the Site owner and other commercial tenants since 1998. The Shear Building has been utilized as a residential apartment and the current residential tenant utilizes the first floor of the building for the storage, repair, and maintenance of power sports equipment (i.e., all-terrain vehicles [ATVs], snowmobiles, etc.).

1.3 Surrounding Land Use

The Site is located in a mixed residential and undeveloped wooded area of Windham. The Site is bounded to the west by a thin strip of land owned by the S.D. Warren Company (S.D. Warren) for hydroelectric dam water control purposes and beyond that the Presumpscot River. The Site is also bounded to the north by undeveloped wooded land owned by S.D. Warren. The Site is bounded to the east by a railroad easement, which is currently utilized as a walking trail. The State of Maine Correctional Center operates a prison to the east of the railroad easement and also owns undeveloped wooded land located to the south of the Site.

1.4 Potential Future Site Use

The Site is planned to be redeveloped for residential purposes. The Site buildings are proposed to be renovated for residential use with the exception of portions of the Main Building closest to the

Presumpscot River, which are proposed to be demolished and redeveloped as parking areas. Two new apartment buildings, one on each side of Mallison Falls Road, are proposed to be constructed at the property. Asphalt-paved parking areas/driveways and landscaped areas are proposed to be constructed throughout existing, developed portions of the Site surrounding the Site buildings.

2.0 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

The following is a summary of previous environmental investigations and remedial activities reportedly conducted at the Site.

"*Environmental Assessment*", Rich Tool & Die Company Site, 3 Mallison Falls Road, Windham, Maine, prepared by John D. Tewhey Associates, Inc. (Tewhey), dated March 1992.

In March 1992, Tewhey prepared a Phase I ESA report for the Site for the former Site owner/occupant, Rich Tool & Die Company, a metal parts manufacturer. Tewhey noted the following in their Phase I ESA report:

1. Soils and groundwater at the Site have likely been impacted by the historical and current industrial use of the Site. OHM spills have been reported at the Site to MEDEP that discharged into the Presumpscot River.

2. Hydrogeologic conditions at the Site promote the discharge of contaminants via migration in shallow groundwater or surface water to the Presumpscot River. The Site soils are relatively impermeable and would tend to be protective of groundwater within bedrock at the Site.

3. A 500-gallon fuel oil UST was reported to be inactive behind (south) of the Shear Building.

Based on these findings, Tewhey recommended that the inactive 500-gallon fuel oil UST should be properly removed in accordance with MEDEP's Chapter 691 regulations and Rich Tool & Die Company should comply with hazardous waste closure requirements upon vacating the Site.

"*Phase II Environmental Assessment*", Rich Tool & Die Company Site, 3 Mallison Falls Road, Windham, Maine, prepared by John D. Tewhey Associates, Inc. (Tewhey), dated April 1995.

From January to March 1995, Tewhey was contracted by Rich Tool & Die to conduct a Phase II subsurface investigation at the Site, in order to address recommendations identified in their March 1992 Phase I ESA. Specifically, Tewhey oversaw the advancement of three soil/bedrock borings (identified as B-1, B-2, and B-3), field screening of soil samples, installation of three groundwater monitoring wells (MW-1, MW-2, and MW-3) in the aforementioned soil borings, completion of groundwater elevation surveys, and the collection and chemical analysis of soil and groundwater samples. Based on the information obtained during this Phase II investigation, Tewhey made the following conclusions relative to subsurface conditions at the Site:

1. The geology of the Site consists of relatively thin glacial deposits of silt and clay overlaying glacial till and bedrock except where man-made structures have sand and gravel backfill. The Site does not overlie a sand and gravel aquifer.

2. Groundwater flows from east to west-southwest and likely discharges to the Presumpscot River.

3. Potential sources of contamination were investigated in association with the Main Building, Shear Building, and the Press Building. Petroleum residues were detected to a limited extent in one soil boring (B-2), which was advanced to the southwest of the Shear

Building. The residual petroleum concentrations were below MEDEP's remedial guidelines at that time (Baseline Cleanup Goals presented in MEDEP's *Guidelines for Establishing Standards for Remediation of Oil Contaminated Soil and Groundwater*, 1995).

4. No significant detections of hazardous waste or petroleum constituents were identified in groundwater samples collected at the Site at concentrations exceeding state or federal drinking water criteria.

Based on their conclusions, Tewhey recommended that no additional subsurface environmental investigations or remedial activities were warranted at the Site.

"*Closure Report*", Rich Tool & Die Company Site, 3 Mallison Falls Road, Windham, Maine, prepared by John D. Tewhey Associates, Inc. (Tewhey), dated April 1995.

According to this report, the former Site occupant/owner (Rich Tool & Die Company) vacated the Site in 1992 and underwent a MEDEP-approved RCRA closure in 1995. Hazardous wastes generated at the Site were primarily 1,1,1-trichloroethane (TCA). The following RCRA closure activities were completed at the Site:

1. Removal and off-site disposal of remaining drums/containers of hazardous waste from the Site, specifically from the TCA degreasing/distillation room and adjacent drum storage enclosure located in the Main Building and the hazardous waste storage area located in the Shear Building;

2. Removal and off-site disposal of wooden floor boards in the TCA degreasing/distillation room and the hazardous waste storage area located in the Shear Building.

The RCRA license status (U.S. EPA ID# MED985468099) for the Site was changed to "Non-Generator" status when these RCRA closure activities were completed.

"Phase I Environmental Site Assessment", Mallison Falls Mill, 3 & 4 Mallison Falls Road, Windham, Maine, Rev. 1." Ransom Consulting, Inc., June 13, 2014.

In June 2014, Ransom completed a Phase I ESA for the Site under Greater Portland Council of Governments' (GPCOG's) Brownfields Assessment Program in accordance with ASTM International Standard Practice E 1527-13 and U.S. EPA All Appropriate Inquiry (AAI), 40 CFR Part 312. The Phase I ESA identified *recognized environmental conditions* (RECs) in connection with the Site's former saw mill and woolen mill operations and historical destructive fires, which may have resulted in adverse impacts to soil, groundwater, and soil vapor at the Site. Based on the Phase I ESA findings, the developed portions of the Site were targeted for additional investigation through the completion of a Phase II ESA.

"Phase II Environmental Site Assessment", Mallison Falls Mill, 3 & 4 Mallison Falls Road, Windham, Maine, Rev. 1." Ransom Consulting, Inc., May 7, 2015.

In February 2015, Ransom conducted a Phase II ESA for the Site utilizing Brownfields petroleum-eligible activities under GPCOG's Municipal Brownfields Site Assessment Program (Cooperative Agreement No. 96149301). Phase II activities that were not eligible under the Brownfields petroleum assessment program were funded privately by Mallison Falls Road, LLC. Based on the results of our Phase II ESA, soil, groundwater, and soil vapor at the Site were identified to contain elevated contaminant

concentrations that would likely present an exposure risk to future residential occupants, commercial workers, and/or construction workers unless remedial activities and/or mitigation measures are enacted to prevent exposure to contaminated media identified at the property.

Specifically, surficial soils [shallower than 2 feet below ground surface (bgs)] throughout the Site were found to contain anthropogenic urban fill with coal and/or wood combustion byproducts. The presence of these contaminants in surficial soils is likely associated with historical fires, former industrial operations at the Site, and/or former railroad activities along the Site's northern boundary. The urban fill-impacted surficial soils also contain elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) and metals, specifically arsenic and lead, at concentrations above their respective Maine Department of Environmental Protection (MEDEP) Remedial Action Guidelines (RAGs) for "Residential", "Outdoor Commercial Worker" and/or "Excavation/Construction Worker" exposure scenarios. These urban fill-impacted soils were also identified at the northern parking lot portion of the Site (Lot 8; 4 Mallison Falls Road). The urban fill soils identified at the northern parking lot also contained PAHs and arsenic at concentrations above their "Residential" RAGs, but they did not exceed their "Urban Fill Background" or Undeveloped Background" concentrations, as defined by the RAGs.

Ransom also identified apparent weathered, petroleum-impacted subsurface soils (deeper than 2 feet bgs) and petroleum-impacted groundwater at the former location of two 3,000-gallon fuel oil underground storage tanks (USTs) near the southeastern corner of the Main Building. Laboratory analysis of these petroleum-impacted subsurface soils indicated that they contain low-level volatile petroleum hydrocarbons (VPH) fractions, extractable petroleum hydrocarbon (EPH) fractions, and PAHs. The concentrations of these petroleum constituents did not exceed their respective MEDEP RAGs for "Excavation/Construction Worker" exposure. However, laboratory analysis of groundwater collected at the location of these former USTs contained elevated concentrations of petroleum constituents, specifically naphthalene and VPH fractions exceeding their respective MEDEP RAGs for "Residential" and "Construction Worker" direct contact exposure and incidental ingestion risk and/or Maximum Exposure Guidelines (MEGs) for drinking water ingestion risk.

Low-level petroleum-related volatile organic compounds (VOCs) and air petroleum hydrocarbon (APH) fractions were also detected in soil vapor at the location of these former 3,000-gallon fuel oil USTs at concentrations that did not exceed their calculated Indoor Air Targets, as specified in MEDEP's RAGs. Therefore, the low-level concentrations of these petroleum-related VOCs and APH fractions detected in soil vapor do not appear to present a vapor intrusion risk to current and/or future Site occupants at the Main Building.

Apparent weathered, petroleum-impacted surficial and subsurface soils and groundwater was also identified at the former location of the 500-gallon fuel oil UST near the southeastern corner of the Shear Building. Laboratory analysis of these petroleum-impacted surficial soils indicated that they contain elevated concentrations of PAHs exceeding their respective MEDEP RAGs for "Residential," "Outdoor Commercial Worker", and MEDEP's "Urban Fill Background" concentrations. Additionally, laboratory analysis of groundwater collected at the location of this former UST contained an elevated concentration of naphthalene (petroleum constituent) exceeding its MEDEP RAGs for "Residential" and "Construction Worker" direct contact exposure and incidental ingestion risk and its MEG for drinking water ingestion risk. An elevated concentration of one petroleum-related VOC (1,3-butadiene) was also detected in soil vapor at a concentration that exceeded its calculated Indoor Air Target for "Residential" exposure for the sample collected at the location of the former 500-gallon fuel oil UST near the Shear Building. The elevated concentration of this petroleum-related VOC detected in soil vapor may present a vapor intrusion risk to current and/or future Site occupants at the Shear Building.

Ransom did not find evidence of land-spread petroleum-impacted soils, petroleum-saturated soils, or "free-phase" petroleum-impacted groundwater at the Site during the Phase II ESAs. However, petroleum-impacted subsurface soils (located approximately 13 to 14 feet bgs) and groundwater was encountered near the southeastern exterior corner of the Main Building. Based on the location and results of the sampling, the presence of these petroleum-impacted soils and groundwater is not likely associated with fuel oil releases from the former, removed USTs that were located near the northeastern corner of the Main Building or the southeastern corner of the Press Building. Therefore, this observed contamination is likely the result of the documented lubricating oil releases (MEDEP Spill# P-541-1990) or other unknown/unreported petroleum releases that may have occurred at the Site.

"Hazardous Materials Inventory", Mallison Falls Mill, 3 & 4 Mallison Falls Road, Windham, Maine, Ransom Consulting, Inc., March 30, 2015.

The Hazardous Materials Inventory (HMI) was conducted concurrently with the Phase II ESA in February 2015. The investigation identified asbestos-containing material (ACM) and lead-based painted surfaces in all three Site Buildings. Potential PCB-containing fluorescent light ballasts and mercury-containing fluorescent light tubes were also recognized inside all three Site Buildings. In addition, potential mercury-containing thermostat switches and ozone-depleting substances, including refrigeration units and window/wall-mounted air-conditioning units were found in the buildings.

In accordance with local, State, and Federal laws and regulations, all of these hazardous building materials are required to be abated, removed, and properly disposed of off-site, prior to or during proposed renovation activities and/or partial demolition of the Main Building at the Site. Based on the quantities of hazardous building materials identified during the HMI, Ransom estimated the cost of hazardous materials removal and disposal to be $198,265 without engineering design, construction oversight, or Brownfields programmatic costs.

3.0 SITE CHARACTERIZATION AND CLEANUP GOALS

Previous environmental investigations completed at the Site identified contaminated surficial and subsurface soils, groundwater, and soil vapor associated with historical Site operations. The identified contamination and appropriate cleanup goals are summarized below.

3.1 Site Geology and Hydrogeology

Soils encountered during the Phase II ESA were relatively consistent throughout the Site with slight variations. Beneath the asphalt-paved ground surface, granular fill soils were encountered, which consisted of loose to very dense, black to brown, fine to medium sand with varying amounts of silt, gravel, and cobbles. The fill soils extended at inconsistent depths ranging from 3 to 11 feet bgs. Apparent anthropogenic urban fill materials, including brick fragments, ash, coal, and clinkers/slag were encountered in the fill soils. Native till soils, consisting of silt and clay with varying amounts of sand and gravel were encountered beneath the fill layer at inconsistent depths ranging from 3 to 14 feet bgs. Drilling refusal suggesting the presence of presumed bedrock was encountered in all soil borings at approximate depths ranging from 7 to 14 feet bgs. Groundwater was encountered at depths ranging from 8.9 to 13.8 feet bgs during the investigation.

Concurrent with the Phase II ESA, a relative groundwater elevation survey was conducted in order to evaluate the local groundwater flow direction at the Site. Coupled with depth to groundwater data, relative groundwater elevations were calculated as shown in the following table. The data indicates a hydraulic gradient and associated interpreted groundwater flow direction in a south-southwesterly direction towards the Presumpscot River.

3.2 Surface Water Bodies/Floodplains

The Presumpscot River flows in a general southerly direction along the southwestern Site boundary. No surface water bodies are located at the Site with the exception of ephemeral streams flowing across the southern undeveloped portion of the Site to the Presumpscot River and western portions of the Main Building, which are constructed over the Presumpscot River. Based on the Cumberland County, Maine National Flood Insurance Program Map (Community Panel Number 2301890025B) portions of the Site along the Presumpscot River are located within a 100-year flood zone.

3.3 Impacted Surficial and Subsurface Soils

Surficial soils throughout the developed portions of the Site contain anthropogenic urban fill with coal and/or wood combustion byproducts, which were likely associated with historical fires, former industrial operations at the Site, and/or former railroad activities along the Site's northern boundary. Laboratory analytical results of the urban fill-impacted surficial soils indicated that they contain elevated concentrations of PAHs and metals, specifically arsenic and lead, at concentrations above their respective MEDEP RAGs for "Residential", "Outdoor Commercial Worker" and/or "Excavation/ Construction Worker" exposure scenarios. Based on these findings, it is possible that contaminant concentrations detected in the surficial urban fill soils may pose an exposure risk to current and/or future Site occupants or construction workers.

Apparent weathered, petroleum-impacted surficial and subsurface soils were also identified at the former location of the 500-gallon fuel oil UST near the southeastern corner of the Shear Building. Laboratory analysis of these petroleum-impacted surficial soils indicated that they contain elevated concentrations of

PAHs exceeding their respective MEDEP RAGs for “Residential,” “Outdoor Commercial Worker”, and MEDEP’s “Urban Fill Background” concentrations.

Ransom identified apparent weathered, petroleum-impacted subsurface soils (deeper than 2 feet bgs) at the former location of two 3,000-gallon fuel oil USTs near the southeastern corner of the Main Building. Laboratory analysis of these petroleum-impacted subsurface soils indicated that they contain low-level VPH fractions, EPH fractions, and PAHs. Based on these findings, it is inferred that residual fuel oil-impacted soil associated with the two former 3,000-gallon fuel oil USTs does not appear to pose an exposure risk to current and/or future Site occupants or construction workers.

Petroleum-impacted subsurface soils (located approximately 13 to 14 feet bgs) was identified near the southeastern exterior corner of the Main Building. The presence of these petroleum-impacted subsurface soils may be associated with the documented lubricating oil releases (MEDEP Spill# P-541-1990) or other potential unknown/unreported petroleum releases that may have occurred at the Site.

The Site is proposed to be redeveloped for residential reuse. As such, the cleanup goal for the Site is to eliminate or reduce the risk of human contact to the contaminated surficial soils at portions of the Site that are impacted by petroleum constituents, PAHs, and metals. Targeted soil removal activities and/or the installation of a barrier or engineered cover system over contaminated soils would likely eliminate human exposure through direct contact, ingestion, or inhalation to contaminated soils. If a cover system were selected as the remedial activity, a deed restriction will be required, which would outline requirements for proper maintenance of the cover system, and would prohibit disturbing the cover and/or performing excavation activities at the Site, without prior notification and approval of the MEDEP.

The areas of impacted surficial soils requiring mitigation are depicted on Figure 4, Proposed Mitigation Plan.

3.4 Impacted Soil Vapor

An elevated concentration of one petroleum-related VOC (1,3-butadiene) was detected in soil vapor at a concentration that exceeded its calculated Indoor Air Target for “Residential” exposure at the location of the former 500-gallon fuel oil UST near the Shear Building. The elevated concentration of this petroleum-related VOC detected in soil vapor may present a vapor intrusion risk to current and/or future Site occupants at the Shear Building.

Low-level petroleum-related VOCs and APH fractions were also detected in soil vapor at the location of these former 3,000-gallon fuel oil USTs at concentrations that did not exceed their calculated Indoor Air Targets, as specified in MEDEP’s RAGs. Therefore, the low-level concentrations of these petroleum-related VOCs and APH fractions detected in soil vapor do not appear to present a vapor intrusion risk to current and/or future Site occupants at the Main Building. No evidence of soil vapor impacts were identified in the vicinity of the Press Building during the Phase II ESA.

Based on these results, vapor mitigation systems would likely not be required for the Main Building or the Press Building. However, if the Shear Building is proposed to remain at the Site, sub-slab and/or indoor air sample(s) should be collected at this building and submitted for laboratory analysis of APH compounds. These sub-slab and/or indoor air sample(s) will further evaluate the potential for vapor intrusion of volatile petroleum compounds identified in soil vapor outside of the building footprint to migrate inside the building and determine the need for a vapor mitigation system in the building.

A vapor barrier and/or passive sub-slab depressurization system should also be incorporated into the design of any new proposed Site structures to mitigate impacts to indoor air quality from potential vapor intrusion of volatile contaminants. Vapor mitigation systems are similar to and/or analogous to radon mitigation systems and are relatively easy to install and incorporate into the design of new building foundations.

3.5 Impacted Groundwater

Groundwater throughout the developed portions of the Site was identified to contain elevated concentrations of metals, specifically antimony, arsenic, and lead. The detected concentrations of these metals in groundwater would present a drinking water ingestion and residential dermal exposure risk, but would not present an exposure risk to construction workers at the Site.

Ransom identified petroleum-impacted groundwater at the former location of two 3,000-gallon fuel oil USTs near the southeastern corner of the Main Building, near the former location of the 500-gallon fuel oil UST near the southeastern corner of the Shear Building, and near the southeastern exterior corner of the Main Building. Laboratory analysis of groundwater collected at these locations contained elevated concentrations of petroleum constituents, specifically naphthalene, benzo(a)pyrene (a PAH), and/or VPH fractions exceeding their respective MEDEP RAGs for “Residential” and “Construction Worker” direct contact exposure and accidental ingestion risk and/or MEGs for drinking water ingestion risk.

Municipal water is available to the Site; therefore, ingestion of contaminated groundwater is not anticipated to represent an exposure route for these contaminants. Due to the shallow groundwater table at the majority of the Site (as shallow as 8 ft bgs), the contaminated groundwater also has the potential to represent a direct contact risk to future construction workers. However, considering the brief timeframe for which workers would be exposed, and the relatively volatile nature of the contaminants, the contaminated groundwater is not expected to represent a significant or chronic health risk for future construction workers. Therefore, no additional cleanup activities to further mitigate impacted groundwater are proposed or recommended at this time. It is recommended that a deed restriction be imposed on the property restricting the extraction of groundwater, without prior notification and approval of the MEDEP.

3.6 Asbestos-Containing Materials (ACM)

ACM was identified in all three Site buildings that were assessed during Ransom’s HMI. The cleanup goal for the Site, pertaining to the ACM, is to eliminate the risk of human contact to ACM during renovation and/or partial demolition activities and future Site reuse. Cleanup actions including removal of ACM should be completed to meet U.S. EPA and MEDEP regulatory requirements and eliminate human exposure through inhalation.

3.7 Lead-Based Paint (LBP)

As part of the HMI, Ransom also conducted an inspection for the presence of LBP via the collection of representative paint chip samples for lead analysis. Samples were analyzed for lead content via EPA SW-846 3rd Ed. Method 3050B/Method 7420 for atomic absorption. Lead-based paint was identified in all three Site buildings assessed during the HMI.

Handling of components coated with lead-containing paint *at any concentration* requires compliance with the Occupational Safety and Health Administration (OSHA) lead standard (*Lead in Construction*, 29 CFR 1926.62). Under the existing conditions, facility maintenance staff or contractors may perform

demolition, renovation, abatement, stabilization, cleanup, and daily operations in buildings that have lead-based paint or lead-containing paint, provided that this regulatory requirement is met.

Since the Site Buildings are proposed to be renovated and/or partially demolished, the cleanup goal for the Site pertaining to the LBP is to eliminate the risk of human contact to lead during renovation and demolition activities and future Site reuse. Cleanup/abatement activities, such as lead removal and/or encapsulation, should be completed to meet Occupational Safety and Health Administration (OSHA), MEDEP, and U.S. EPA regulatory requirements, and to eliminate lead-contaminated dust exposure to contractors and the general public.

Lead waste, including LBP waste in construction and demolition (C&D) debris, with the exception of household waste, may be subject to the hazardous waste requirements of the U.S. EPA's *Resource Conservation and Recovery Act* (RCRA) and Maine's Hazardous Waste Regulations. To determine the required method for the disposal of items that are not household waste, this waste receiving facility may require representative sampling of the debris to determine the quantity of lead that would be expected to leach into the environment if the debris were disposed of in a landfill. In order to determine this leaching potential, the representative sample(s) should be analyzed by Toxicity Characteristic Leaching Procedure (TCLP). If concentrations are 5 milligrams per liter (mg/l) or greater, the debris must be disposed of as hazardous waste. If concentrations are less than 5 mg/l, the debris is not regulated and materials may be disposed of as general construction debris. To minimize the total volume of hazardous waste (if present), segregating hazardous from non-hazardous waste is advisable.

3.8 Universal Waste

Universal waste is a general term used to describe hazardous wastes that are generated by a large, diverse population. Businesses as well as unregulated households generate universal waste. This term is intended to be broad so that a wider range of wastes may be managed under the reduced requirements of the U.S. EPA's Universal Waste Rule. U.S. EPA's universal waste regulations streamline hazardous waste management standards for federally designated "universal wastes," which include:

1. Batteries;
2. Pesticides;
3. Mercury-containing equipment; and
4. Bulbs (lamps).

The State of Maine has expanded the designation of universal waste to include, in addition to those items listed above, automobile mercury switches and totally enclosed non-leaking PCB containing fluorescent light ballasts. The regulations govern the collection and management of these widely generated wastes, thus facilitating environmentally sound collection and proper recycling or treatment.

Universal wastes present at the Site include, but are not limited to, potential PCB-containing fluorescent light ballasts, mercury-containing fluorescent light tubes, mercury-containing thermostat switches, ozone-depleting substance containing window/wall-mounted air-conditioning unit and commercial refrigeration units. The clean-up goal for universal waste is to prevent these wastes from entering the general waste stream through proper removal, storage, and transport to an appropriate off-Site recycling or disposal facility as universal waste.

4.0 DESCRIPTION OF EVALUATION CRITERIA

The comparison of the remediation alternatives was conducted using the evaluation and threshold criteria discussed below.

4.1 Overall Protection of Human Health and the Environment

Alternatives must pass this threshold criterion to be considered for implementation as the recommended alternative. The goal of this criterion is to determine whether a remediation alternative provides adequate protection of human health and the environment. It also addresses how identified risks are eliminated, reduced, or controlled. Protection of human health is assessed by evaluating how site risks from each exposure route are eliminated, reduced, or controlled through the specific alternative.

4.2 Technical Practicality

The focus of this evaluation criterion is to determine technical practicality of instituting the specific alternative. This criterion evaluates the likelihood that the alternative will meet project specifications.

4.3 Ability to Implement

This criterion analyzes technical feasibility and the availability of services and materials. Technical feasibility assesses the ability to implement and monitor the effectiveness of the alternative. Availability of services and materials evaluates the need for off-site treatment, storage or disposal services and the availability of such services. Necessary equipment, specialists and additional resources are also evaluated.

4.4 Reduction of Toxicity, Mobility, and Volume

This criterion evaluates the ability of the remediation alternative to significantly achieve reduction of the toxicity, mobility, and volume of the hazardous substances present at the Site. This analysis evaluates the quantity of hazardous substances and/or petroleum-impacted media to be removed, the degree of expected reduction in toxicity, the type and quantity of residuals to be reduced, and the manner in which the principle threat is addressed through the remediation alternative.

4.5 Short Term Effectiveness

This criterion addresses the period of time needed to complete the remediation, potential adverse impacts on human health and the environment that may exist until the cleanup goals are achieved, and the time frame for accomplishing the associated reduction in the identified environmental conditions.

4.6 Resiliency to Climate Change Conditions

This criterion evaluates the resilience of the remediation alternative to reasonably foreseeable changing climate conditions, such as increasing/decreasing temperatures, increasing/decreasing precipitation, extreme weather events, rising sea level, changing flood zones, and higher/lower groundwater tables, among others.

4.7 Preliminary Cost

The preliminary cost criterion for the remediation alternatives evaluates the estimated capital, operation, and maintenance costs of each alternative. Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering, sampling contingencies, and licenses. Costs were developed as a balancing criterion for the remedial alternatives and should not be construed as bid costs or engineer's cost estimates. Cost may be used as a distinguishing factor in the selection of the remedial action. The preliminary costs developed should in no way be construed as a cost proposal, but rather a guide for selecting a remedial action.

5.0 EVALUATION OF REMEDIATION ALTERNATIVES

Based on the evaluation criteria outlined in the previous section and the potential exposure pathways identified for the Site, the remedial actions selected for the Site should accomplish the following objectives:

1. Minimize the potential for direct contact, incidental ingestion, or inhalation of contaminated surficial and subsurface soils and groundwater located throughout the Site;

2. Minimize the potential for inhalation of contaminated soil vapor detected on the Site;

3. Minimize the potential for human exposure to hazardous building materials; and

4. Reduce the toxicity, mobility, and volume of hazardous building materials.

To achieve these objectives, three remedial options were considered and are discussed in the following subsections.

5.1 Considered Remediation Alternatives

Three remedial alternatives were considered for the Site to remediate contaminated soils onsite, including the "No Action" alternative, "Soil Cover Systems" alternative, and "Limited Soil Removal and Soil Cover Systems" alternative. These alternatives were evaluated using the criteria described in Section 4.0 and are summarized below. The attached Table 1 includes a Summary of the Evaluation and Comparison of the Remedial Alternatives.

5.2 No Action Alternative

A "No Action" alternative signifies that no remediation activities would be conducted at the Site, and that hazardous building materials would not be removed. The "No Action" alternative does not include a means for mitigating exposure to identified adverse environmental conditions or unacceptable risks remaining from contaminated soils, groundwater, and soil vapor or hazardous building materials. Therefore, the potential for human exposure through direct contact, ingestion, and/or inhalation continues to exist for current trespassers and potential future Site occupants, workers, or trespassers.

The "No Action" alternative is not protective of human health and the environment and does not meet the threshold criteria. The "No Action" alternative would not achieve reduction of the toxicity, mobility, and volume of the hazardous substances present at the Site.

In addition, the "No Action" alternative would not be an effective remediation alternative, and potential impacts to human health would remain at the Site. The "No Action" alternative was not selected for implementation or further consideration because the contaminated soils, groundwater, and soil vapor and hazardous building materials would continue to pose a health risk to existing trespassers and future Site occupants, workers, and trespassers.

5.3 Soil Cover Systems Alternative

The second remediation alternative evaluated in this ABCA is the "Soil Cover Systems" alternative. This alternative involves mitigating the potential for human exposure to impacted soils through installation of cover systems over impacted soils at the Site. It should be noted that the additional

remedial actions outlined in Section 5.6, would also be incorporated into this alternative to address hazardous building materials, contaminated groundwater, and contaminated soil vapor at the Site.

Please see Figure 4 which illustrates areas of surficial contaminated soil identified throughout developed portions of the Site. Figure 5 depicts several types of MEDEP-approved protective cover systems that may be used at this Site, depending on final reuse and/or redevelopment scenarios.

Additional remedial activities are proposed to be conducted at the Site in conjunction with this alternative. An institutional control (deed restriction) would likely be recorded to require Post-Closure Cover System Maintenance and a Soil and Groundwater Management Plan for the Site to specify procedures to be followed to prevent future exposure to contaminated soil and groundwater. The Post-Closure Cover System Maintenance and Soil and Groundwater Management Plan would stipulate the proper characterization, handling, and management of contaminated soils and groundwater, which may be encountered and displaced during redevelopment of the Site property (e.g., displaced and/or excess soils generated during installation of new foundations/utilities may require on-site management and/or off-site disposal). The deed restriction should also prohibit the extraction of Site groundwater in order to safeguard the public and subsurface utility workers from exposure to contaminated groundwater.

This remedial alternative would also include the installation of a passive vapor mitigation system in the Shear Building in order to mitigate the potential for volatile petroleum compounds identified in soil vapor outside of the building footprint to migrate inside the building. Passive vapor mitigation systems should also be installed in conjunction with the construction of any future occupied building(s) at the Site, which will minimize the risk of exposure to impacted soil vapor (through vapor intrusion into any future building) to future inhabitants or workers at the Site. As an alternative to the installation of a vapor mitigation systems in the Site buildings, an additional vapor intrusion assessment may be completed, which concludes that vapor intrusion would not be a risk to future inhabitants or workers in the Shear Building or future, occupied buildings at the Site.

The evaluation of the "Soil Cover Systems Alternative" is discussed below.

5.3.1 Overall Protection of Human Health and the Environment

This alternative provides adequate protection of human health and the environment through eliminating the risk of human exposure to the petroleum-, PAH-, and/or heavy metals-impacted soils via installing a cover system over areas of impacted soils. In addition, a Soil and Groundwater Management Plan will also be prepared and implemented to minimize and manage future exposures to contaminated soils and groundwater during Site redevelopment. The goal of reducing or eliminating the risk of human exposure to impacted soils could be achieved through this alternative.

5.3.2 Technical Practicality

Cover system activities are technically practical. The construction of engineering cover systems could be completed utilizing accepted construction techniques. Contractors with experience with similar projects are readily available in the region.

5.3.3 Ability to Implement

Covering the impacted soils is technically feasible and is an effective action for reducing the risk of human exposure. Services and materials necessary to conduct this alternative are readily available.

5.3.4 Reduction of Toxicity, Mobility and Volume

This remediation alternative can achieve reduction in the mobility of the impacted soils at the Site. Construction of engineered cover systems over areas of impacted soils would reduce the risk of direct contact by existing trespassers and potential future site occupants, workers, and trespassers. However, since no impacted soil would be removed from the site, the volume of impacted soils onsite would not be reduced.

5.3.5 Short Term Effectiveness

The remedial action objective could be attained when the impacted soils covered with the MEDEP-approved cover systems. Potential adverse impacts to human health from exposure to contaminated soils and groundwater may exist until the cleanup goals are achieved.

5.3.6 Resiliency to Climate Change Conditions

Although the Presumpscot River serves as the southern Site boundary, climate change effects from rising sea level and changing flood zones are not anticipated to represent a major threat due to a significant rise/elevation of the stream. Therefore, the primary climate change concerns would be associated with extreme weather, increased rainfall, and rising groundwater tables. This remedial alternative meets the objectives associated with these criteria by capping impacted soils, which may come into contact with rain/stormwater. However, the cover/cap system will shed or redirect stormwater run-off and minimize infiltration within the impacted areas. Because impacted soils may remain onsite, rising groundwater tables have the potential to come into contact with impacted soils; however, the contaminants of concern are not expected to be significantly leachable, thus reducing potential groundwater impacts.

5.3.7 Preliminary Cost

The estimated costs associated with this remedial alternative are outlined in the attached Table 2 - Summary of Estimated Remediation Costs for “Soil Cover Systems” Alternative with Full Hazardous Building Materials Abatement. Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering and sampling contingencies. For the purposes of this evaluation, Ransom assumed that hazardous building materials would be properly removed during proposed renovation activities and partial demolition of the Main Building. Cover systems installed over impacted soils at the Site would be conducted during Site redevelopment activities. The costs associated with this alternative are not prohibitive, since they are lower than costs associated with the Limited Soil Removal and Soil Cover System Alternative.

5.4 Limited Soil Removal and Soil Cover Systems Alternative

The third remediation alternative evaluated in this ABCA is the “Limited Soil Removal and Soil Cover Systems” alternative. This alternative involves mitigating the potential for human exposure to impacted

soils through targeted excavation and off-Site disposal of impacted soils with subsequent installation of MEDEP-approved cover systems over remaining impacted soils at the Site. It should be noted that the additional remedial actions outlined in Section 5.6, would also be incorporated into this alternative to address hazardous building materials, contaminated groundwater, and contaminated soil vapor at the Site.

As previously discussed, surficial soils (zero to 2 feet bgs) throughout the Site were discovered to be impacted with petroleum constituents, PAHs, and/or heavy metals exceeding their respective MEDEP RAGs for "Residential", "Outdoor Commercial Worker", and/or "Excavation/ Construction Worker" exposures. Based on the area of impacted surficial soils throughout developed portions of the Site [approximately 90,000 square feet (SF)] and an estimated target excavation with an average thickness of 2 feet, it is anticipated that approximately 6,700 cubic yards (CY) of petroleum-, PAH-, and/or heavy metals-impacted surficial soil would be removed from the Site.

Once excavation activities are completed, the top foot of impacted surficial soils at the Site would be backfilled with clean fill and topsoil material or improved with cover systems (i.e., building, asphalt-paved driveways/parking areas, concrete or brick sidewalks, landscaping, etc.), based on the redevelopment scenarios for the specific areas.

Additional remedial activities are proposed to be conducted at the Site in conjunction with this alternative. An institutional control (deed restriction) would likely be recorded to require Post-Closure Cover System Maintenance and a Soil and Groundwater Management Plan for the Site to specify procedures to be followed to prevent future exposure to contaminated soil and groundwater. The Post-Closure Cover System Maintenance and Soil and Groundwater Management Plan would stipulate the proper characterization, handling, and management of contaminated soils and groundwater, which may be encountered and displaced during redevelopment of the Site property (e.g., displaced and/or excess soils generated during installation of new foundations/utilities may require on-site management and/or off-site disposal). The deed restriction should also prohibit the extraction of Site groundwater in order to safeguard the public and subsurface utility workers from exposure to contaminated groundwater.

This remedial alternative would also include the installation of a passive vapor mitigation system in the Shear Building in order to mitigate the potential for volatile petroleum compounds identified in soil vapor outside of the building footprint to migrate inside the building. Passive vapor mitigation systems should also be installed in conjunction with the construction of any future occupied building(s) at the Site, which will minimize the risk of exposure to impacted soil vapor (through vapor intrusion into any future building) to future inhabitants or workers at the Site. As an alternative to the installation of a vapor mitigation systems in the Site buildings, an additional vapor intrusion assessment may be completed, which concludes that vapor intrusion would not be a risk to future inhabitants or workers in the Shear Building or future, occupied buildings at the Site.

The evaluation of the "Limited Soil Removal and Soil Cover Alternative" is discussed below.

5.4.1 Overall Protection of Human Health and the Environment

This alternative provides adequate protection of human health and the environment through eliminating the risk of human exposure to the petroleum-, PAH- and/or heavy metals-impacted soils via targeted soil removal activities and installing a cover system over potential, remaining residual-impacted soils. In addition, a Soil and Groundwater Management Plan will also be prepared and implemented to minimize and manage future exposures to contaminated soils and groundwater during Site redevelopment. The goal of reducing or eliminating the risk of human exposure to impacted soils could be achieved through this alternative.

5.4.2 Technical Practicality

Limited soil removal and cover system installation activities are technically practical. The removal of petroleum, PAH- and/or heavy metals-impacted soil and the construction of engineering cover systems could be completed utilizing accepted construction techniques. Both contractors and disposal facilities with experience with similar projects are readily available in the region.

5.4.3 Ability to Implement

Removal and off-site disposal of petroleum-, PAH-, and/or heavy metals-impacted soils and covering potential, remaining residual-impacted soils is technically feasible and is an effective action for reducing or eliminating the risk of human exposure. Services and materials necessary to conduct this alternative are readily available.

5.4.4 Reduction of Toxicity, Mobility and Volume

This remediation alternative can achieve reduction in the mobility and volume of the impacted soils at the Site. The removal of impacted soils and construction of engineered cover systems over potential, remaining residual-impacted soils would reduce the risk of direct contact by existing trespassers and potential future site occupants, workers, and trespassers.

5.4.5 Short Term Effectiveness

The remedial action objective could be attained when the impacted soils were removed from Site and the cover system put in place. Potential adverse impacts to human health from exposure to contaminated soils and groundwater may exist until the cleanup goals are achieved.

5.4.6 Resiliency to Climate Change Conditions

Although the Presumpscot River serves as the southern Site boundary, climate change effects from rising sea level and changing flood zones are not anticipated to represent a major threat due to the significant rise of the stream bank. Therefore, the primary climate change concerns would be associated with extreme weather, increased rainfall, and rising groundwater tables. This remedial alternative meets the objectives associated with these criteria by removing petroleum-, PAH- and/or heavy metals-impacted soils and capping potential, remaining residual-impacted soils, which may come into contact with rain/stormwater. However, the cover/cap system will shed or redirect stormwater run-off and minimize infiltration within the impacted areas. Because impacted soils may remain onsite, rising groundwater tables have the potential to come into contact with impacted soils; however, the contaminants of concern are not expected to be significantly leachable, thus reducing potential groundwater impacts.

5.4.7 Preliminary Cost

The estimated costs associated with this remedial alternative are outlined in the attached Table 3 - Summary of Estimated Remediation Costs for “Limited Soil Removal & Soil Cover Systems” Alternative with Full Hazardous Building Materials Abatement. Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering and sampling contingencies. For the purposes of this evaluation, Ransom assumed that hazardous building materials would be properly removed during proposed building renovation and/or

demolition activities. Targeted excavation of off-site disposal of petroleum, PAH-, and/or heavy metals-impacted soils and installation of a MEDEP-approved cover system over potential, remaining residual-impacted soils at the Site would be conducted during Site redevelopment activities. The costs associated with this alternative are prohibitive, since they are higher than costs associated with all other proposed Alternatives.

5.5 Additional Remedial Activities Performed Regardless of Selected Alternative

In addition to the soil remediation activities associated with the "Soil Cover Systems" and "Limited Soil Removal and Soil Cover" alternatives discussed above, the following additional remedial activities are proposed to be completed at the Site to address known hazardous building materials, contaminated groundwater, and contaminated soil vapor at the Site:

1. Asbestos Containing Building Materials: Prior to conducting renovation or demolition activities in onsite buildings, a contractor will be required to removal all friable ACM (easily reduced to powder using hand pressure). Asbestos will be removed and disposed of by a state licensed professional asbestos removal contractor in accordance with Chapter 425 of MEDEP regulations including all necessary MEDEP notifications, handling, disposal, air clearance samples and reporting.

2. Lead Paint: In accordance with state and federal regulations, the lead content of the building materials with identified lead-based paint will be tested prior to off-site disposal. If concentrations are less than the hazardous level for lead-based paint waste, the materials may be disposed of as general construction debris. To minimize the total volume of hazardous waste (if present), the segregation of hazardous and non-hazardous waste will be conducted.

3. Universal Waste: Prior to conducting renovation or demolition activities in on-Site buildings, a contractor will be required to removal all identified universal wastes.

4. Contaminated Groundwater: A deed restriction and/or institutional controls in the form of a Declaration of Environmental Covenant (DEC) shall be prepared which prohibits the extraction of groundwater without MEDEP notification and consent.

5. Contaminated Soil Vapor: A passive vapor mitigation system is also recommended to be installed in the Shear Building. Passive vapor mitigation systems should also be installed in conjunction with the construction of any future occupied building(s) at the Site, which will minimize the risk of exposure to impacted soil vapor (through vapor intrusion into any future building) to future inhabitants or workers at the Site. Vapor mitigation systems are similar and/or analogous to radon mitigation systems and are able to be installed and incorporated into the design of new or existing building foundations. As an alternative to the installation of a vapor mitigation systems in the Site buildings, an additional vapor intrusion sampling and assessment could be completed in the hopes of determining that vapor intrusion would not be a risk to future inhabitants or workers in the Shear Building or future, occupied buildings at the Site.

5.6 Selection of Proposed Remediation Alternative

Based on the results of the initial screening of each alternative, as shown on Table 1 and discussed in detail above, Alternative 2: the "Soil Cover Systems" alternative has been selected as the preferred

remediation alternative. This alternative is proven to protect human health and the environment; is effective, technically feasible, and practical; and is cost-effective. Please note that costs presented in Table 2 for the chosen alternative do not include programmatic and environmental design costs if Brownfields Cleanup Funds are to be used for Site redevelopment and remediation. These costs would include, but are not limited to, the following: Site-Specific Quality Assurance Project Plan, Vapor Mitigation Design, MEDEP VRAP Submittals, Historic Preservation, Bidding Documents & Contractor Selection, Oversight of Cleanup Activities & Confirmatory Sampling, Community Relations Plan & 30-day Public Comment, and Public Meetings. These costs typically range from $30,000 to $50,000.

Please note that redevelopment plans for the Site were conceptual at the time this ABCA/RAP was completed. Therefore, these remedial alternatives have provisions to be expanded, based on final size/layout/configuration of the future Site redevelopment. Once redevelopment plans have been finalized, it's possible that remedial activities may include a combination of the "Soil Cover Systems" and "Limited Soil Removal and Soil Cover Systems" alternatives, which may also include on-Site relocation and reuse of impacted soils beneath MEDEP-approved cover systems.

6.0 CONCEPTUAL REMEDIAL ACTION PLAN

The "Soil Cover Systems" alternative protects human health and the environment and is effective, technically feasible, and practical. Because this alternative meets the evaluation criteria and is not cost-prohibitive, this alternative has been selected for implementation at the Site for remediation of contaminated soils at the property. This alternative includes the implementation of institutional controls/deed restrictions, which protect the cover systems and requires a Soil and Groundwater Management Plan and Post-Closure Cover System Maintenance Plan. It should be noted that as part of this alternative, contaminated soil will remain on the Site.

Based on the proposed future use of the Site for residential purposes, the final cleanup goal for the Site is to minimize the risk of human exposure to the soils located throughout the Site that are contaminated with petroleum constituents, PAHs, and metals at concentrations exceeding their corresponding MEDEP RAGs for "Residential," "Outdoor Commercial Worker," and "Excavation/Construction Worker" exposure scenarios.

In addition to the soil cover system, other remedial activities will be completed at the Site to address known hazardous building materials, contaminated groundwater, and contaminated soil vapor at the Site, including: removal and disposal of ACM and universal wastes prior to proposed building demolition activities; proper disposal of lead-based painted building materials; implementation of a DEC, which prohibits the extraction of groundwater at the property; and recommendations for installation of vapor mitigation systems for the existing Shear Building and future, occupied buildings at the Site.

6.1 Soil Cover Systems

Soil cover systems will be installed over surficial soils with contaminant concentrations exceeding their corresponding MEDEP RAGs. Soil cover systems can be in the form of 1) a minimum of 4 inches of pavement, asphalt, or concrete with marker layer; 2) a minimum of 12 inches of compacted clean fill (or riprap) with marker layer; 3) a combination of at least 8 inches of compacted clean fill, 4 inches of vegetated topsoil, and marker layer; 4) a minimum of 24-inches of compacted clean fill (or riprap); or 5) a structural cover (i.e. concrete building foundation). These options are further discussed below:

<u>Asphalt/Concrete Pavement Cover Systems (Parking Lots, Driveways, Sidewalks, etc.)</u>: Asphalt and/or concrete parking lots, driveways, sidewalks, or other paved areas proposed to be constructed as part of Site redevelopment can act as cover systems over contaminated soil. These impervious cover systems should be underlain by a minimum of 6 inches of clean compacted structural soils (gravel sub-base materials) to ensure the structural integrity of the paved parking/driveway/sidewalk areas, as well as a marker layer (snow fence or geotextile marker layer) indicating the extent of clean materials. It should be noted that building slabs and foundations (existing or proposed) would fall under this category of engineered cover system.

<u>Fill/Loam/Rip Rap/Stone Landscaped Cover Systems</u>: Areas utilizing a loam/fill/rip rap cover systems will be underlain with a marker layer (snow fence or geotextile marker layer) indicating the extent of clean materials. A minimum of 12 inches of compacted fill or rip rap material will be placed in these areas over the marker layer. In areas where grass or other plantings are proposed, 8 inches of compacted fill and 4 inches of compacted loam shall be placed, which will then be seeded or planted in accordance with the redevelopment landscape plans. No less than 12-inches total cover material shall be permitted in these areas underlain by a marker layer over the contaminated soils.

Clean Fill/Rip Rap Cover Systems: Areas of contaminated soil may also be covered by 24-inches of compacted clean fill or rip rap. In areas where the cover system is 24 inches or greater, no marker layer is necessary.

In addition, impacted soils excavated from other areas of the Site during redevelopment activities may be relocated at the property underneath an approved cover system, as noted above. Figure 4 presents a conceptual schematic of the various types of potential cover systems that may be used to accommodate future Site redevelopment plans.

6.2 Asbestos Abatement/Removal

Airborne asbestos fibers represent a potential human health hazard. ACM may be managed in-place as long as it remains intact, undamaged, and in good condition. Current regulations require that ACM be removed if it will be disturbed by renovation, demolition, or other building maintenance activities. Since the Site Buildings are proposed for renovated and portions of the Main Building located near the Presumpscot River are proposed to be demolished, ACM identified within interior and exterior portions will require removal prior to the initiation of these activities.

ACM abatement must be performed using approved methods in accordance with applicable regulations established by the U.S. EPA, OSHA, and the State of Maine. ACM will be removed by a licensed asbestos abatement contractor and in accordance with a project design prepared by a certified Abatement Project Designer.

Key elements of any asbestos abatement include the following:

1. Notification: A notification is required to be filed prior to any removal repair, demolition, enclosure, encapsulation, or handling of more than three linear or square feet of an asbestos-containing material with the exception of demolition of single family owner-occupied residential dwellings. This notification requirement designed to provide the MEDEP with adequate information to effectively schedule compliance inspections.

   The notification must be postmarked at least 10 calendar days, or received by the MEDEP at least 5 working days, prior to commencement of the asbestos abatement project. The start date on the notification should encompass the set-up of the regulated area, including any pre-cleaning and the hanging of polyethylene sheeting.

2. Asbestos Abatement Contractor:

   a. License Requirements: A company engaged in an asbestos abatement activity must hold a valid Asbestos Abatement Contractor license.

   b. Personnel Requirements: A licensed Asbestos Abatement Contractor must have a certified Asbestos Abatement Project Supervisor employed on staff.

      Asbestos abatement work must be completed by individuals trained in accordance with OSHA, U.S. EPA and MEDEP requirements. Individuals must possess a valid MEDEP certification.

3. Asbestos Abatement Activities: Asbestos abatement activities in the state of Maine are subject to the following work practice requirements:

   a. All projects must be performed in accordance with a project design by a MEDEP-certified Asbestos Project Designer.

   b. A certified Asbestos Abatement Project Supervisor must be designated as the lead supervisor for the project and must be present at the work Site at all times personnel are within the regulated area.

   c. Prior to starting an asbestos abatement activity, the Asbestos Abatement Contractor must establish the regulated area. For activities where containment is not required, the regulated area must be demarcated with barrier tape marked "ASBESTOS HAZARD" (or equivalent wording) and OSHA warning signs, and located such that it protects persons from exposure to asbestos and minimizes the number of persons in the area. In facilities where plastic barrier tape may cause a safety hazard, red cloth tape may be used.

   d. The regulated area must include a polyethylene-enclosed structure formed by partitions or framing or by covering walls and ceilings with a minimum of two layers of 4-mil polyethylene sheeting or one layer of 6-mil polyethylene sheeting, and by covering the floor with a minimum of two layers of 6-mil polyethylene sheeting. The surface to be abated does not need to be covered with polyethylene sheeting. Exterior walls must have critical barriers and any seams must be fiber tight.

   e. Access into the polyethylene-enclosed containment area is provided through a decontamination unit. The decontamination unit consists of aluminum, tin, fiberglass, preformed plastic, or other impervious surface, or two layers of 6-mil polyethylene sheeting. Decontamination units must have 6-mil polyethylene sheeting flaps or air-locks between each chamber.

   f. A ventilation system providing an exchange of at least four volumes of air per hour at a volume sufficient to establish and maintain a pressure differential within the ambient environment of negative 0.02 inches of water column. The ventilation units must be operated in accordance with U.S. EPA recommendations set forth in Appendix J of U.S. EPA Guidance Document EPA 560/5-85-024 (effective June, 1985) or in Appendix F to 29 CFR Part 1926.1101 (effective August 10, 1994). Make-up air entering the containment must pass through the decontamination system whenever possible, or through waste load-out and/or make-up air intakes specified by the project design. The exhaust air must be HEPA filtered before being discharged outside of the work area and must be discharged to the outside.

   g. Individuals not directly involved in the asbestos abatement activity must be excluded from the regulated area. Warning signs, meeting the requirements established by OSHA (29 CFR 1926.1101), are required at all approaches to the regulated area, and at the decontamination and waste load out unit's outermost boundaries.

4. Personal Protective Equipment: An individual involved in an asbestos abatement activity or an individual who enters the regulated area, excluding the clean room, must be provided with and wear appropriate respiratory protection and personal protective clothing. Minimum respiratory protection shall be half-faced negative pressure respirator equipped with HEPA filters. Minimum protective clothing shall be disposable full body suits, including head and foot coverings. OSHA also regulates asbestos activities involving respirators and personal protective equipment. OSHA regulations may require a higher degree of respiratory protection and/or protective clothing.

5. Wetting of ACM: Prior to removal of ACM, including removal of components covered with thermal system insulation, all ACM must be adequately wetted with water. Throughout the removal, storage, transport, and disposal processes, ACM must be kept adequately wet.

6. Containerization of Asbestos Waste: Prior to removal from the regulated area, asbestos waste must be containerized in fiber-tight leak-proof packaging and properly labeled, in accordance with OSHA requirements (29 CFR 1926.1101). Fiber-tight packaging must be maintained throughout the storage, transport, and land filling processes.

   Friable asbestos waste that does not contain components with sharp edges must be adequately wetted and then containerized in two polyethylene bags with a 6-mil minimum thickness for each bag.

   Exterior cementious asbestos-containing materials must be wetted and containerized in leak-proof containers for delivery to a landfill licensed to accept non-friable waste. Other non-friable waste may be packaged as friable or must be adequately wetted and thoroughly wrapped in a minimum of two layers of 6-mil or one layer of 12-mil polyethylene sheeting with all joints, seams, and overlaps sealed in a fiber-tight manner. Containerization in disposable leak-proof fiber-tight containers, such as fiber-tight drums, is also acceptable. Non-friable waste also may be packaged in large containers, such as dumpster or roll-offs, as long as the container is lined with two layers of 6-mil or one layer of 12-mil polyethylene sheeting and secured fiber-tight prior to transport and the ACM is maintained in a non-friable state when placed in the dumpster. Fiber-tight packaging must be maintained throughout storage, transport, and off-loading at the landfill.

7. Close-out: Following the initial visual evaluation and receipt of acceptable air clearance sampling results from a MEDEP-Certified Asbestos Air Monitor, the contractor can remove the containment, critical barriers, and the decontamination unit from the work Site. The contractor must cleanup any visible dust or debris resulting from teardown activities prior to the final inspection after removal of containment. An asbestos abatement activity is not considered complete and acceptable for regulated area release until a visual evaluation and final air clearance standards have been met.

6.3 Lead-Based Paint Abatement

Lead-based paint identified in the Site buildings will be abated and/or encapsulated in accordance with OSHA, ME DEP, and U.S. EPA regulations in order to eliminate lead-contaminated dust exposure to contractors and the general public. Since the buildings are proposed to be renovated and portions of the Main Building are proposed to be demolished, LBP abatement conducted as part of this cleanup project

may include off-site disposal of the lead-painted surfaces/materials as construction and demolition debris at an appropriate disposal facility.

Lead in paint was detected on various materials throughout the Site buildings. Handling of components coated with lead-containing paint requires compliance with the OSHA lead standard ("Lead in Construction," 29 CFR 1926.62). Under the existing conditions, demolition contractors may perform demolition, renovation, abatement, stabilization, cleanup, and daily operations in buildings that have lead-based paint or lead-containing coatings, provided that the following regulatory requirements are met:

1. Renovation or demolition activities that disturb surfaces that contain lead must be conducted in accordance with the OSHA regulation 29 CFR 1926.62 "Lead Exposure in Construction: Interim Final Rule." This regulation requires that a Site-specific health and safety plan be prepared before conducting activities that create airborne lead emissions such as cutting, grinding, or sanding surfaces coated with lead-containing paint. Such a plan must include the identification of lead components, an exposure assessment, and, if applicable, the required work procedures and personal protective equipment to be used.

2. The U.S. EPA and ME DEP regulate the disposal of potentially hazardous wastes. Such wastes include paint chips and residue generated during abatement or repainting work, or whole components, such as wood windows, doors, and trim coated with lead-containing paint and disposed of as a result of renovation or demolition work. Metal components are not regulated if they will be recycled and not disposed of in a landfill.

3. To minimize exposure to airborne dust or fumes containing lead and avoid the requirement to implement a lead exposure assessment, torch burning, cutting, grinding, or similar high impact work on components covered by lead-containing paint should be avoided. Such work would need to be conducted by properly trained workers using appropriate worker protection and engineering controls. For work activities that may generate airborne lead, the employer should perform an initial exposure assessment (personal air monitoring) for each individual task (e.g. demolition, abrasive blasting, and painting) that has the potential for causing worker exposure to be at or above the OSHA Action Level (30 micrograms of lead per cubic meter of air). In lieu of monitoring, recent historical data from similar operations may be used to comply with OSHA requirements.

4. Upon completion of the project, remaining lead-based paint, if any, will require proper management. A Lead-Based Paint O&M Program, outlining the management of lead-paint including training, monitoring, and hazard communication will be developed to ensure that lead is managed properly, is necessary.

6.4 Universal & Hazardous Waste Removal

Universal and hazardous waste will be handled, transported disposed in accordance with MEDEP regulations. Trained individuals will package the waste in appropriate containers with proper labeling. Shipment of waste will be conducted in accordance with established Maine Department of Transportation protocol.

6.5 Deed Restrictions/Institutional Controls/Declaration of Environmental Covenant (DEC)

As stated previously, institutional controls and a deed restriction will be required following the construction of soil cover systems at the Site, which will include the following, at a minimum:

1. Notify future Site owners/occupants of the existence and location of soil contamination at the Site;

2. Prohibit future disturbance of the cover system during construction, remediation, or landscaping without prior notification and consent from the MEDEP;

3. Require a Soil and Groundwater Management and Cover System Maintenance Plan to specify the procedures for handling contaminated soil and groundwater during Site redevelopment and long-term maintenance procedures for the different types of cover systems installed at the Site. This maintenance plan will establish routine inspection procedures and requirements for the repair and/or reconstruction of the cover systems, as necessary, to maintain the physical barriers and mitigate contact with impacted soils remaining at the Site;

4. Prohibit groundwater extraction at the Site to prevent future exposure to contaminated groundwater; and

5. Recommend installation of a vapor mitigation system in the Shear Building and incorporate vapor mitigation systems in the construction of any future, occupied buildings, in order to minimize the risk of exposure to impacted soil vapors. As an alternative to the installation of a vapor mitigation systems, an additional vapor intrusion assessment may be completed, which concludes that vapor intrusion would not be a risk to future inhabitants or workers in the Shear Building and/or future, occupied buildings at the Site.

6.6 Permitting & Erosion Control Measures

Appropriate local, State, and Federal permitting requirements should be conducted, prior to commencing with remediation activities. Given that the proposed remediation activities are adjacent to (but not within) Presumpscot River, a Maine Construction General Permit (MCGP) and a Natural Resources Protection Act (NRPA) Permit-by-Rule will likely be required for the project. In addition, under the MCGP, erosion control measures are proposed to be implemented and maintained throughout the project in accordance with the Maine Erosion and Sediment Control Best Management Practices (BMPs).

7.0 SITE CLOSURE AND REPORTING

The Site was entered into MEDEP's VRAP in May 2015. Therefore, MEDEP VRAP will review environmental conditions and proposed remedial actions. Upon agreement with the proposed work by the MEDEP, the MEDEP will issue a VRAP No Action Assurance (NAA) letter.

An approved final written completion report summarizing the field activities conducted as part of the remediation of the Site will be submitted to the MEDEP. The final report will include a description of the remedial actions and field methods implemented at the Site. Upon submittal and approval of the completion documentation, the MEDEP VRAP will issue a Certificate of Completion.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Previous environmental investigations conducted at the Site identified contamination associated with historical Site operations, including the presence of hazardous building materials and contaminated soils, groundwater and soil vapor. To address the soil contamination onsite, three remediation alternatives were evaluated, including a "No Action" alternative, "Soil Cover System" alternative, and "Limited Soil Removal and Soil Cover System" alternative. These alternatives also included additional remedial work including the full removal and abatement of hazardous building materials, and the implementation of deed restrictions which prohibit the future use of on-site groundwater and recommend implementation of vapor mitigation systems in the existing Shear Building and future buildings at the property.

The "No Action" alternative was determined to be unacceptable because it did not meet threshold criteria of the overall protection of human health and the environment. The "Limited Soil Removal and Soil System Cover" alternative is cost-prohibitive and therefore, was not chosen. The "Soil Cover System" with Full HMI Abatement alternative protects human health and the environment and is effective, technically feasible, and practical. Because this alternative meets the evaluation criteria, and is not cost-prohibitive, this is the recommended remedial alternative. In addition, a deed restriction will be established for the Site, which will provide specific notification and Site management requirements.

Please note that the redevelopment plans for the Site at the time this ABCA/RAP was completed may be subject to change during final federal-, state- or town-approval processes or revisions made by the development team. Therefore, these remedial alternatives are conceptual and have provisions to be expanded, based on final size/layout/configuration of the future Site redevelopment. Once redevelopment plans have been finalized and approved by governmental agencies, it's possible that remedial activities may include a combination of the "Soil Cover Systems" and "Limited Soil Removal and Soil Cover Systems" alternatives, which may also include on-Site relocation and reuse of impacted soils beneath MEDEP-approved cover systems.

Ransom recommends that this ABCA/RAP be submitted to the MEDEP VRAP for review and approval (i.e., to obtain a VRAP NAA letter). Upon acceptance, the remedial actions will be documented and the results of the actions presented in a completion report submitted to the MEDEP VRAP to obtain a final VRAP Certificate of Completion.

9.0 SIGNATURE(S) OF ENVIRONMENTAL PROFESSIONAL(S)

The following Ransom personnel possess the sufficient training and experience necessary to conduct an Analysis of Brownfields Cleanup Alternatives, and from the information generated by such activities, have the ability to develop opinions and conclusions regarding remediation alternatives and a Conceptual Remedial Action Plan, as presented herein, for the Site.

Environmental Professionals:

_____

Aaron R. Martin, C.G.
Project Manager/Environmental Scientist

_____

Stephen J. Dyer, P.E.
Senior Project Manager

TABLE 1 – SUMMARY OF THE EVALUATION AND COMPARISON OF SOIL REMEDIAL ALTERNATIVES
MALLISON FALLS MILL
3 & 4 MALLISON FALLS ROAD, WINDHAM, MAINE

Remedial Action Alternative (RAA)	Overall Protection of Human Health and the Environment	Technical Practicality	Ability to Implement	Reduction of Toxicity, Mobility and Volume	Short Term Effectiveness	Resiliency to Climate Change Conditions	Estimated Cost	Comments
1) No Action	• Long-term risks to human health by direct contact, inhalation, and ingestion will remain. • Potential long-term risks to the environment by stormwater runoff and/or leaching to groundwater may continue. • Cleanup levels will not be met.	• Not applicable.	• Not applicable – other than natural attenuation, no response action will be implemented.	• No reduction in toxicity, mobility or volume of the contaminated media.	• Not applicable – other than natural attenuation, no response action will be implemented. Ineffective natural attenuation due to the types of identified contaminants.	• Impacted soils will remain in contact with stormwater, rainfall, and groundwater.	• This alternative will involve ongoing security measures and maintenance and will cost approximately $1,000 per year.	• This alternative does not address the recognized environmental conditions and contamination stigma at the property. • Because hazardous building materials and contaminated soil and groundwater will remain onsite, this alternative will require a deed restriction to limit future site use, restrict access to the buildings, require proper management of contaminated soil and groundwater at the Site.
2) Soil Cover Systems	• Risks to human health by direct contact, inhalation and ingestion of contaminated media is significantly reduced or eliminated by covering the contaminated soils. • Risks to the environment are reduced by capping the contaminated soils that may come in contact with rain or stormwater. • The proposed alternative will protect human health and the environment from direct exposure by capping the contaminated soils and installing a physical barrier.	• The construction of engineering cover systems could be completed utilizing accepted construction techniques. Therefore, the alternative is technically practical.	• Covering the contaminated soils at the property is technically feasible. • The necessary services and materials to complete the remedial tasks are readily available.	• This alternative reduces the mobility contaminated soils onsite by capping impacted soil. • No reduction in the toxicity or volume of contaminated soil would occur, but these soils would be covered which achieves the goal of reducing the risk of human exposure.	• Capping of impacted soils is a proven method of remediation.	• Impacted soils are covered, reducing the risk of direct contact with stormwater/rainfall. • Impacted soils may still come into contact with rising groundwater tables.	• The estimated cost for the Soil Cover Systems with Full Hazardous Building Materials Abatement Alternative is approximately $720,000. • Capital costs include materials and equipment, and indirect capital costs such as engineering and sampling. • These cost estimates are for budgetary purposes only and in no way should be construed as a cost proposal.	• Additional necessary remedial actions associated with this alternative would include: the full removal and abatement of hazardous building materials; and the creation of institutional controls/deed restrictions which will prohibit future disturbance of the cover system, require a Soil and Groundwater Management Plan, require a Cover System Maintenance Plan, and prohibit groundwater extraction at the Site. • A soil vapor mitigation system would be recommended for the existing Shear Building and all future occupied buildings onsite.
3) Limited Soil Removal & Soil Cover Systems	• Risks to human health by direct contact, inhalation and ingestion of contaminated media is significantly reduced or eliminated by removing specific areas of contaminated surficial soil and hazardous building materials from the Site and covering the remaining contaminated soils. • Risks to the environment are reduced by removing the impacted soils and their ability to leach into groundwater and potentially migrate to off-site properties. • The proposed alternative will reduce some of the elevated contaminant concentrations below regulatory exposure guidelines and the physical barrier and institutional controls will protect human health and the environment from direct exposure.	• The removal of impacted soil and the construction of engineering cover systems could be completed utilizing accepted construction techniques. Therefore, the alternative is technically practical.	• Removal and off-site disposal of impacted soils and covering potential residual contaminated soils at the property is technically feasible. • This alternative is an effective action for reducing and eliminating the risk of human exposure and the potential for impacted soils to leach into groundwater and potentially migrate offsite. • The necessary services and materials to complete the remedial tasks are readily available.	• This alternative reduces the mobility and volume of contaminated soils onsite. • No reduction in the toxicity of potential contaminated soil remaining would occur, but these soils would be covered which achieves the goal of reducing the risk of human exposure.	• Removal of impacted soils and subsequent soil cover systems are proven methods of remediation.	• Impacted soils are removed and potential residual impacted soils are covered, reducing the risk of direct contact with stormwater/rainfall. • Impacted soils may still come into contact with rising groundwater tables.	• The estimated cost for the Limited Soil Removal and Soil Cover Systems with Full Hazardous Building Materials Abatement Alternative is approximately $1,550,000. • Capital costs include materials and equipment, and indirect capital costs such as engineering and sampling. • These cost estimates are for budgetary purposes only and in no way should be construed as a cost proposal.	• Additional necessary remedial actions associated with this alternative would include: the full removal and abatement of hazardous building materials; and the creation of institutional controls/deed restrictions which will prohibit future disturbance of the cover system, require a Soil and Groundwater Management Plan, require a Cover System Maintenance Plan, and prohibit groundwater extraction at the Site. • A soil vapor mitigation system would be recommended for the existing Shear Building and all future occupied buildings onsite.

Table 2: Summary of Estimated Remediation Costs

HMI Abatement & Soil Cover Systems Alternative	Number	Units	Unit Cost	Total
HMI Abatement				
Abatement	1	LS	$193,265	$193,265
Abatement Design and Oversight [1]	1	LS	$5,000	$5,000
Disposal and Transportation				
Tree/Debris Removal [2]	1	LS	$5,000	$5,000
Clean Cover System				
New Apartment Building Slab/Foundation- Lot 7 (30 apt units) [3]	1	LS	$120,000	$120,000
New Apartment Building Slab/Foundation- Lot 8 (24 apt units) [3]	1	LS	$80,000	$80,000
Pavement [4]	350	T	$150	$52,500
Turf Reinforcement Mat (TRM) [5]	3,300	SY	$30	$99,000
Erosion Control	1	LS	$5,000	$5,000
Vapor Mitigation Systems				
Materials and Labor	1	LS	$15,000	$15,000
Soil Cover Systems Engineering Design/Oversight/Closure Report				
Design [6]	1	LS	$7,500	$7,500
Oversight [7]	80	Hrs	$75	$6,000
Report [8]	1	LS	$12,500	$12,500
Subtotal				*$600,765*
Contingency 20% [9]				$120,153
TOTAL				**$720,918**

1 - Cost includes bidding documents and contractor selection.
2- Assumes removal of tree trunks, shrubs, and branches on impacted surficial soils.
3 - Construction costs based on developer's estimates.
4- Assumes impacted surficial soils encompass approximately 60,000 SF to be covered with 2 in. of pavement (6,500 SY x 110 lbs/(inch x SY)=715,000 lbs or 350 tons); cost to furnish and install included.
5- Assumes impacted soils approximately encompass 30,000 SF (30,000 SF /9 = 3,300 SY); includes furnishing and installation of TRM, 8" of clean cover material, and 4" of loam and seed.
6- Cost includes bidding documents and contractor selection.
7- Assumes 2 weeks of Site work and necessary oversight.
8- Cost includes VRAP Closure Report, Post Closure Cover System Maintenance & Soil Management Plan, and drafting the Declaration of Environmental Covenant.
9- Covers previously unidentified issues that could come up during cleanup activities on Site.

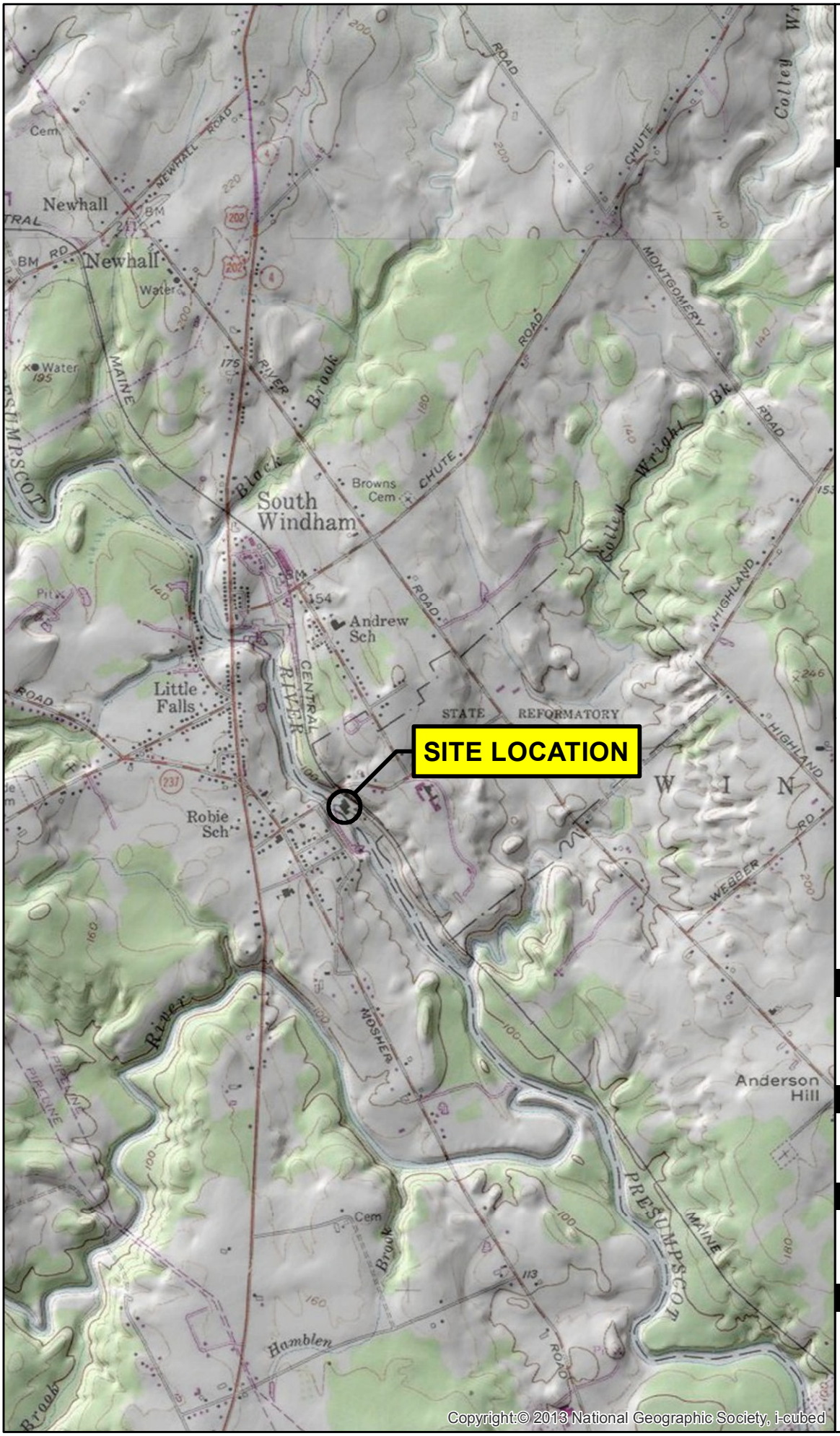
NOTE: Costs presented in table above do not include programmatic and environmental design costs in Brownfields Cleanup Funds are to be used for Site redevelopment and remediation. These costs would include, but are not limited to, the following: Final Cleanup/ Abatement Plan, Site-Specific Quality Assurance Project Plan, MEDEP VRAP Submittals, Historic Preservation, Community Relations Plan & 30-day Public Comment, and Public Meetings. These costs are estimated to range from $30,000 to $50,000.
LS = Lump Sum, T = Ton, CF= Cubic Foot, CY = Cubic Yard, SF= Square Foot, SY = Square Yard

Table 3: Summary of Estimated Remediation Costs

HMI Abatement & Full Surficial Soil Removal Alternative	Number	Units	Unit Cost	Total
HMI Abatement				
Abatement	1	LS	$193,265	$193,265
Abatement Design and Oversight[1]	1	LS	$5,000	$5,000
Disposal and Transportation				
Tree/Debris Removal [2]	1	LS	$5,000	$5,000
Contaminated Soil [3 & 4]	6,700	CY	$100	$670,000
Disposal Soil Characterization Samples [5]	14	Ea	$1,000	$14,000
Clean Cover System				
New Apartment Building Slab/Foundation- Lot 7 (30 apt units) [6]	1	LS	$120,000	$120,000
New Apartment Building Slab/Foundation- Lot 8 (24 apt units) [6]	1	LS	$80,000	$80,000
Pavement [7]	350	T	$150	$52,500
Turf Reinforcement Mat (TRM) [8]	3,300	SY	$30	$99,000
Erosion Control	1	LS	$5,000	$5,000
Vapor Mitigation Systems				
Materials and Labor	1	LS	$15,000	$15,000
Soil Remediation Engineering Design/Oversight/Closure Report				
Design [9]	1	LS	$7,500	$7,500
Oversight [10]	160	Hrs	$75	$12,000
Report [11]	1	LS	$12,500	$12,500
Subtotal				*$1,290,765*
Contingency 20% [12]				$258,153
TOTAL				**$1,548,918**

1 - Cost includes bidding documents and contractor selection.
2- Assumes removal of tree trunks, shrubs, and branches on impacted surficial soils.
3 - Includes excavation of impacted surficial soils to estimated depth of 2 feet below ground surface across entire developed portion of Site (90,000 SF x 2 FT= 180,000 CF / 27 = 6,700 CY).
4 - Includes excavation, transport, and disposal; assumes 150 CY per day (6,700 CY/ 150 CY per day= 45 days x 8-hour day= 360 hours) and that soils are disposed as special waste (i.e., non-hazardous waste).
5 - Assumes 1 waste characterization soil sample per every 500 CY of soil disposed off-site (6,700 CY/ 500 = 14 samples).
6 - Construction costs based on developer's estimates.
7- Assumes surficial soil excavation areas encompass approximately 60,000 SF to be covered with 2 in. of pavement (6,500 SY x 110 lbs/(inch x SY)=715,000 lbs or 350 tons); cost to furnish and install pavement included.
8- Assumes surficial soil excavation areas encompass approximately 30,000 SF (30,000 SF /9 = 3,300 SY) to be covered with landscaping; includes furnishing and installation of TRM, 8" of clean cover material, and 4" of loam and seed.
9- Cost includes bidding documents and contractor selection.
10- Assumes 4 weeks of Site work and necessary oversight.
11- Cost includes VRAP Closure Report, Post Closure Cover System Maintenance & Soil Management Plan, and drafting the Declaration of Environmental Covenant.
12- Covers previously unidentified issues that could come up during cleanup activities on Site.

NOTE: Costs presented in table above do not include programmatic and environmental design costs in Brownfields Cleanup Funds are to be used for Site redevelopment and remediation. These costs would include, but are not limited to, the following: Final Cleanup/ Abatement Plan, Site-Specific Quality Assurance Project Plan, MEDEP VRAP Submittals, Historic Preservation, Community Relations Plan & 30-day Public Comment, and Public Meetings. These costs are estimated to range from $30,000 to $50,000.
LS = Lump Sum, T = Ton, CF= Cubic Foot, CY = Cubic Yard, SF= Square Foot, SY = Square Yard



RANSOM Consulting Engineers and Scientists

Regional Locator Map

Notes

1. Data Source: USGS National Map Seamless Server, 24K DRG, 1/3" NED
2. USGS Quad Name: Portland-East
3. Latitude: 43° 43' 39" N
   Longitude: 70° 25' 11" W
   UTM Northing: 4842592 mN
   UTM Easting: 385663 mE

Scale and Orientation

0 1,000 2,000

1 inch = 2,000 feet

Prepared For

Mallison Falls Road, LLC
7 Tee Drive
Portland, Maine

Site Address

Mallison Falls Mill
3 & 4 Mallison Falls Road
Windham, Maine

141.06064 | Aug 2015

Figure 1

Site Location

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RANSOM
Consulting
Engineers
and Scientists

Legend & Notes

Notes

1. Site Plan based on Bing Orthophotography
2. Some features are approximate in location and scale
3. This plan has been prepared for Mallison Falls Road, LLC. All other uses are not authorized unless written permission is obtained from Ransom Consulting, Inc.

Scale & Orientation

0 100 200

1 inch = 200 feet

Prepared For

Mallison Falls Road, LLC
7 Tee Drive
Portland, Maine

Site Address

Mallison Falls Mill
3 & 4 Mallison Falls Road
Windham, Maine

141.06064 | Aug 2015

Figure 2
Site Plan

G:\Data\ME\Project\141_06064\Maps\Figure_2.mxd

RANSOM Consulting Engineers and Scientists

Legend & Notes

- Catch Basin
- Former Fuel Oil UST
- Former Septic Tank
- Fuel Oil AST
- Monitoring Well
- Monitoring Well Destroyed
- Pad-Mounted Transformer
- Pole-Mounted Transformer
- Propane AST
- Pump Station
- Septic Tank
- Transformer
- Wall Mounted Transformer
- Soil Boring
- Soil Boring/ Temporary Monitoring Well
- Soil Vapor Point
- Leach Field

Notes

1. Site Plan based on Bing Orthophotography
2. Some features are approximate in location and scale
3. This plan has been prepared for Mallison Falls Road, LLC. All other uses are not authorized unless written permission is obtained from Ransom Consulting, Inc.

Scale & Orientation

0 25 50

1 inch = 50 feet

Prepared For

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7 Tee Drive
Portland, Maine

Site Address

Mallison Falls Mill
3 & 4 Mallison Falls Road
Windham, Maine

141.06064 | Aug 2015

Figure 3
Site Detail Plan

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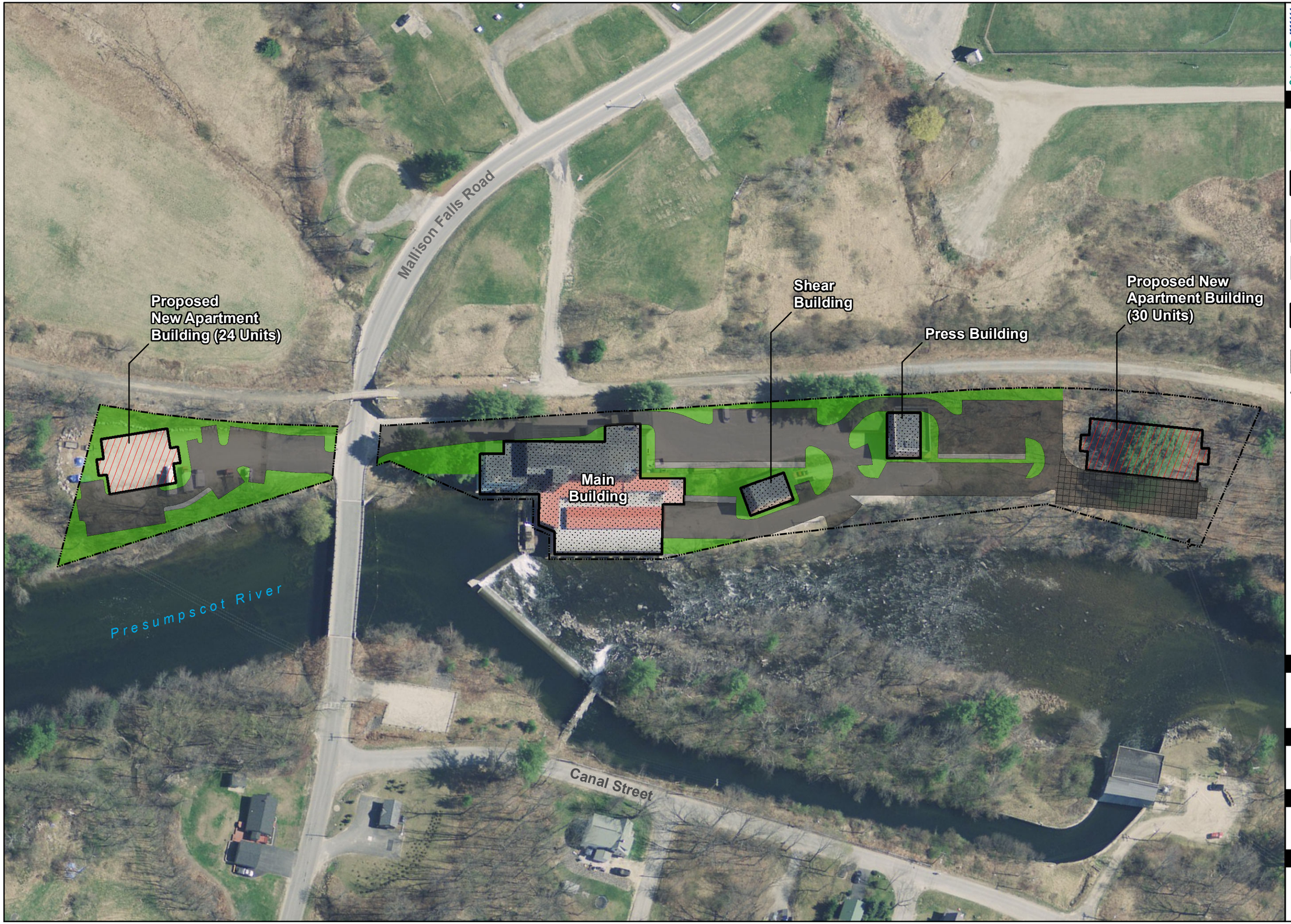

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and Scientists

Legend & Notes

- Proposed Landscaped Areas
- Proposed Building Footprint
- Proposed Asphalt Pavement
- Proposed Walkways
- Proposed Asphalt Pavement w/No Cover System
- Existing Building Footprint
- Lot Boundary

Notes

1. Site Plan based on Bing Orthophotography
2. Some features are approximate in location and scale
3. This plan has been prepared for Mallison Falls Road, LLC. All other uses are not authorized unless written permission is obtained from Ransom Consulting, Inc.

Scale & Orientation

0 50 100

1 inch = 100 feet

Prepared For

Mallison Falls Road, LLC
7 Tee Drive
Portland, Maine

Site Address

Mallison Falls Mill
3 & 4 Mallison Falls Road
Windham, Maine

141.06064 | Aug 2015

Figure 4
Proposed Mitigation Plan

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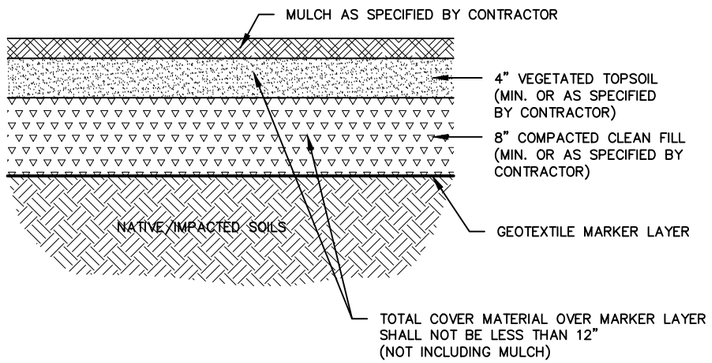
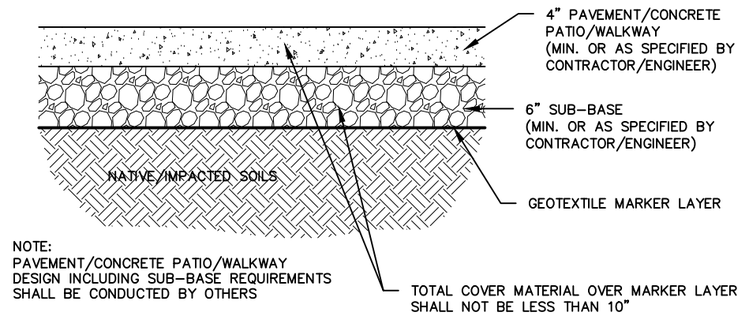
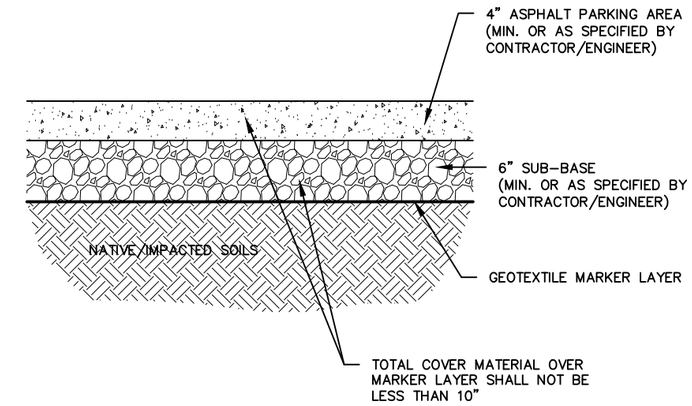


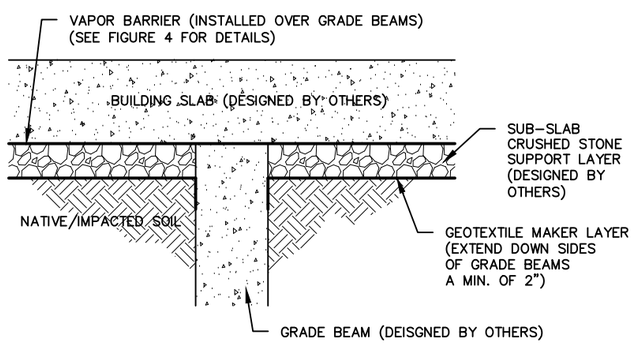
COVER SYSTEM TYPE 1:
LANDSCAPE COVER PLUS MARKER LAYER
NOT TO SCALE



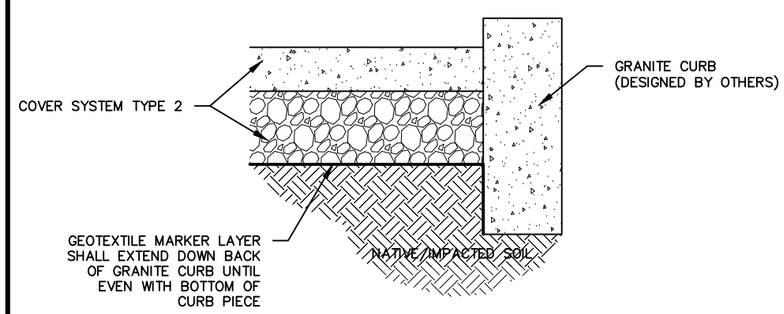
COVER SYSTEM TYPE 2:
ASPHALT/CONCRETE COVER PLUS MARKER LAYER
NOT TO SCALE



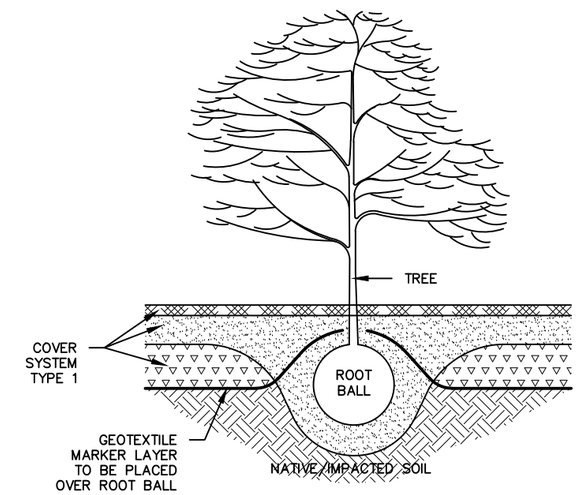
COVER SYSTEM TYPE 3:
ASPHALT PARKING AREA COVER PLUS MARKER LAYER
NOT TO SCALE



COVER SYSTEM TYPE 4:
STRUCTURE/BUILDING FOUNDATION COVER
NOT TO SCALE



SIDEWALK ABUTTING GRANITE CURBING
NOT TO SCALE



TREE PITS
NOT TO SCALE

NOTES:

1. THE QUANTITIES IDENTIFIED ARE MINIMUM REQUIREMENTS FOR COVERING OF THE IDENTIFIED CONTAMINATED SOILS. ADDITIONAL SUB-BASE MATERIALS MAY BE REQUIRED IN AREAS PROPOSED FOR ASPHALT PAVING, BUILDINGS AND/OR CONCRETE SIDEWALKS/PATIOS, AS NECESSARY, TO MAINTAIN STRUCTURAL INTEGRITY OF THESE MATERIALS. THE SITE DESIGN ENGINEER IS REQUIRED TO MAKE THE DETERMINATION OF STRUCTURAL SUITABILITY.
2. GEOTEXTILE MARKER LAYER SHALL BE US65HVO DEMARCATION FABRIC OR APPROVED EQUAL.

RANSOM Consulting, Inc.

PREPARED FOR:	SITE:	***COVER SYSTEM DETAILS***
MALLISON FALLS ROAD, LLC. 7 TEE DRIVE PORTLAND, MAINE	MALLISON FALLS MILL 3 & 4 MALLISON FALLS ROAD WINDHAM, MAINE	DATE: AUGUST 2015 PROJECT: 141.06064 FIGURE: 5

O:\ME-DWGS\2014\141.06064\COVER SYS AND VB.dwg Jul 31, 2015 - 9:44am